

CLAIMS

1. A laser irradiation method comprising:

changing a first laser beam emitted from a solid-state laser oscillator which
5 oscillates a laser beam having a spectral width which is 0.1 nm or more into a second
laser beam whose intensity distribution is homogenized by passing through a beam
homogenizer;

making the second laser beam enter an irradiation surface; and

moving the second laser beam relative to the irradiation surface.

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2. A laser irradiation method comprising:

changing a first laser beam emitted from a solid-state laser oscillator which
oscillates a laser beam having a spectral width which is 0.1 nm or more into a second
laser beam whose intensity distribution is homogenized by passing through a beam
15 homogenizer;

changing the second laser beam into a third laser beam by using a condensing
lens;

making the third laser beam enter an irradiation surface; and

moving the third laser beam relative to the irradiation surface.

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3. A laser irradiation method comprising:

changing a first laser beam emitted from a solid-state laser oscillator which
oscillates a laser beam having a spectral width which is 0.1 nm or more into a second
laser beam whose intensity distribution is homogenized by passing through a beam
25 homogenizer;

changing the second laser beam into a third laser beam by using a slit to block
an end portion of the second laser beam;

making the third laser beam pass through a condensing lens and a projecting
lens so that an image of the third laser beam formed by the slit is projected onto an
30 irradiation surface; and

moving the irradiation surface relative to the laser beam.

4. The laser irradiation method according to any one of Claims 1 to 3,
wherein the condensing lens is a convex cylindrical lens or a convex spherical
5 lens.

5. The laser irradiation method according to any one of Claims 1 to 4,
wherein the solid-state laser oscillator is a solid-state laser oscillator which
includes a crystal of sapphire, YAG, ceramic YAG, ceramic Y_2O_3 , KGW, KYW,
10 Mg_2SiO_4 , YLF, YVO_4 , or $GdVO_4$ doped with at least one of Nd, Yb, Cr, Ti, Ho, and Er.

6. The laser irradiation method according to any one of Claims 1 to 5,
wherein the laser beam is converted by a non-linear optical element.

15 7. The laser irradiation method according to any one of Claims 1 to 6,
wherein the beam homogenizer uses any one of a cylindrical lens array, a light
pipe, and a fly-eye lens.

8. A digital video camera, a digital camera, a navigation system, a sound
20 reproduction device, a display, a mobile terminal, a thin film integrated circuit device,
or a CPU manufactured by using the laser irradiation method according to any one of
Claims 1 to 7.

9. A laser irradiation apparatus comprising:
25 a solid-state laser oscillator for oscillating a laser beam having a spectral
width which is 0.1 nm or more;
a beam homogenizer for homogenizing intensity distribution of the laser beam
emitted from the solid-state laser oscillator; and
means for moving an irradiation surface of the laser beam relative to the laser
30 beam.

10. A laser irradiation apparatus comprising:

a solid-state laser oscillator for oscillating a laser beam having a spectral width which is 0.1 nm or more;

5 a beam homogenizer for homogenizing intensity distribution of the laser beam emitted from the solid-state laser oscillator;

a condensing lens for condensing the laser beam which has passed through the beam homogenizer; and

means for moving an irradiation surface relative to the laser beam.

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11. A laser irradiation apparatus comprising:

a solid-state laser oscillator for oscillating a laser beam having a spectral width which is 0.1 nm or more;

15 a beam homogenizer for homogenizing intensity distribution of the laser beam emitted from the solid-state laser oscillator;

a slit for blocking an end portion of the laser beam whose intensity distribution has been homogenized by the beam homogenizer;

a condensing lens for condensing the laser beam;

20 a projecting lens for projecting an image of the laser beam formed by the slit onto an irradiation surface; and

means for moving the irradiation surface relative to the laser beam.

12. The laser irradiation apparatus according to Claim 10 or 11,

25 wherein the condensing lens is a convex cylindrical lens or a convex spherical lens.

13. The laser irradiation apparatus according to any one of Claims 9 to 12,

wherein the solid-state laser oscillator is a solid-state laser oscillator which includes a crystal of sapphire, YAG, ceramic YAG, ceramic Y_2O_3 , KGW, KYW, 30 Mg_2SiO_4 , YLF, YVO_4 , or $GdVO_4$ doped with at least one of Nd, Yb, Cr, Ti, Ho, and Er.

14. The laser irradiation apparatus according to any one of Claims 9 to 13, wherein the laser beam is a harmonic converted by a non-linear optical element.

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15. The laser irradiation apparatus according to any one of Claims 9 to 14, wherein the beam homogenizer is any one of a cylindrical lens array, a light pipe, and a fly-eye lens.

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16. A digital video camera, a digital camera, a navigation system, a sound reproduction device, a display, a mobile terminal, a thin film integrated circuit device, or a CPU manufactured by using the laser irradiation apparatus according to any one of Claims 9 to 15.

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